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|----------------------------|-------------|-----------------------|---------------------|------------------|
| APPLICATION NO.            | FILING DATE | FIRST NAMED INVENTOR  | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/576,635                 | 04/21/2006  | Christopher N. Bowman | 40281.0001USWO      | 5692             |
| 23552                      | 7590        | 11/03/2009            | EXAMINER            |                  |
| MERCHANT & GOULD PC        |             |                       | BERMAN, SUSAN W     |                  |
| P.O. BOX 2903              |             |                       | ART UNIT            | PAPER NUMBER     |
| MINNEAPOLIS, MN 55402-0903 |             |                       | 1796                |                  |
| MAIL DATE                  |             | DELIVERY MODE         |                     |                  |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                      |
|------------------------------|--------------------------------------|--------------------------------------|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/576,635 | <b>Applicant(s)</b><br>BOWMAN ET AL. |
|                              | <b>Examiner</b><br>/Susan W. Berman/ | <b>Art Unit</b><br>1796              |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 06-23-2009.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 23-25,29,30,32-34 and 44-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 23-25,29,30,32-34 and 44-47 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 21 April 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 7-15-09
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

***Response to Amendment***

The rejection of claim 23 as being anticipated by Jochum et al (5,100,929) is withdrawn in response to the amendment of claim 23 to recite that the initiator is selected from camphorquinone and 2,2-dimethoxy-2-phenyl acetophenone.

Applicant's arguments filed 07-15-2009 have been fully considered but they are not persuasive.

Applicant argues that Jochum et al teach that using a combination of camphorquinone and acyl phosphine oxide results in a "smeary layer". This argument is unpersuasive for the following reasons. What Jochum et al teach, in column 2, lines 13-19, is that when a combination of camphorquinone and tertiary amine or a combination of acylphosphine oxide and tertiary amines is used the compositions cured with visible light have a pronounced layer of smear. Thus, Jochum et al teach against using a combination of camphorquinone and tertiary amine or a combination of acylphosphine oxide and tertiary amines, not against a combination of camphorquinone and acylphosphine oxide visible light initiators. Furthermore, it is noted that the comprising language in the instant claim does not exclude additional initiating components, i.e. the acylphosphine compound taught by Jochum et al, from the composition.

Applicant argues that the instantly claimed compositions are distinguished from those taught by Jochum et al because oxygen inhibition is not seen in the photopolymerized compositions of the instant application. However, applicant has not provided any comparative evidence to support this argument. The polymerizable compositions disclosed by Jochum et al comprise the same polymerizable components as are set forth in instant claim 23. The choice of photoinitiator would not have been expected to have resulted in different properties being

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obtained after photopolymerization of the thiol-functional monomer and the vinyl-functional monomers, in the absence of evidence to the contrary. The reason is that it is the polymerizable materials that would be expected to determine the properties of the product. Jochum et al teach that a “smeary layer” results when camphorquinone is used with a tertiary amine in UV curable compositions and that the problem does not occur with the thiol-ene compositions comprising at least 10 % by weight thiol and at least 10% by weight “ene” components.

With respect to the combination of teachings of Jochum et al and Rheinberger et al, applicant argues that the dental material taught by Rheinberger et al comprises a silicic acid condensate of norbornene or thiol. This argument is not persuasive because Jochum et al are relied upon for teaching polymerizable thiol-ene dental composition representative of the instantly claimed compositions. Rheinberger et al are relied upon for teaching alternative initiators that are useful for polymerizing thiol-ene functional compositions.

***Claim Rejections - 35 USC § 102/35 USC § 103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 23, 24, 25, 29, 30, 32-34 and 44 are rejected under 35 U.S.C. 103(a) as obvious over Jochum et al (5,100,929). Jochum et al disclose dental compositions comprising thiol-enes and a photoinitiator and filler (column 2, line 33, to column 3, line 19). Jochum et al teach that compositions containing at least 10% by weight polythiol compound, at least 10 % by weight poly-ene compound and an acylphosphine compound as photoinitiator provide a cured product free of a smearable layer. Jochum et al teach that camphorquinone and acyl phosphine oxides are known as initiators responsive to visible light that when used in combination with tertiary amines produce a pronounced layer of smear in UV curing compositions and that this disadvantage is overcome by the disclosed thiol-ene compositions comprising an acylphosphine oxide (column 2, lines 9-26). Fillers are taught from column 6, line 64, to column 7, line 15. Jochum et al do not disclose using 2,2-dimethoxy-2-phenyl acetophenone as initiator.

It would have been obvious to one skilled in the art at the time of the invention to employ camphorquinone, instead of or in combination with the acylphosphine oxide, as a visible light initiator in the thiol-ene compositions disclosed by Jochum et al. The reason is that Jochum et al teach that camphorquinone and acyl phosphine oxides are known initiators responsive to visible light for polymerizing dental compositions. It is noted that the comprising language in the instant claim does not exclude additional initiating components, i.e. the acylphosphine compound taught by Jochum et al, from the instantly claimed composition. It would further have been obvious to one skilled in the art at the time of the invention to omit using a tertiary amine in combination with camphorquinone or acylphosphine oxide in order to avoid a smearable layer resulting from incomplete cure, as taught by Jochum et al.

With respect to claims 24 and 25, Jochum does not specifically disclose the recited percentage ranges of thiol functional groups. However, since Jochum et al teach that the compositions contain at least 10% by weight polythiol compound, the instantly recited ranges are considered to be within the disclosure of Jochum et al, in the absence of evidence to the contrary. With respect to claims 29, 30 and 32-34, Jochum et al do not mention the specified properties recited. However, since the polymerizable compositions disclosed by Jochum et al comprise the same components as are set forth in instant claim 23, the instantly claimed properties are expected to be inherent to the prior art polymerized products, in the absence of evidence to the contrary. The choice of photoinitiator would not have been expected to have resulted in different properties being obtained after photopolymerization of the thiol-functional monomer and the vinyl-functional monomers, in the absence of evidence to the contrary. The reason is that it is the polymerizable materials that would be expected to determine the properties of the product.

Claims 23, 24, 25, 29, 30, 32-34 and 44-47 are rejected under 35 U.S.C. 103(a) as obvious over Jochum et al (5,100,929) in view of Rheinberger et al (5,889,132).

Jochum et al disclose dental compositions comprising thiol-enes and a photoinitiator and filler wherein the compositions contain at least 10% by weight polythiol compound (column 2, line 33, to column 3, line 19). Jochum et al teach that camphorquinone and acyl phosphine oxides are known as initiators responsive to visible light that produce a pronounced layer of smear in UV curing compositions and that this disadvantage is overcome by the disclosed compositions (column 2, lines 9-26). Fillers are taught from column 6, line 64, to column 7, line

15. Jochum et al teach that camphorquinone and acyl phosphine oxides are known as initiators responsive to visible light for polymerizing dental compositions.

Rheinberger et al disclose thiol-ene dental compositions and photoinitiators therefor, including camphorquinone, acyl phosphine oxides and 2,2-dimethoxy-2-phenylacetophenone (column 28, lines 39-50). With respect to claims 45-46, Rheinberger et al teach that the  $\alpha$ -diketones, such as camphorquinone, are preferably used with an amine reducing agent (column 28, lines 39-50, and Examples 7 and 11).

It would have been obvious to one skilled in the art at the time of the invention to substitute camphorquinone for the acyl phosphine oxide photoinitiator in the compositions disclosed by Jochum et al. Jochum et al provide motivation by teaching that camphorquinone, as well as acylphosphine oxides, is well known for visible initiation of polymerization of dental compositions. Rheinberger et al specifically teach that camphorquinone or acylphosphine oxides are suitable photoinitiators for thiol-ene dental compositions. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of successfully photoinitiatting polymerization of the thiol-ene dental compositions taught by Jochum et al using camphorquinone as photoinitiator, as taught by Rheinberger et al in analogous dental compositions.

With respect to claims 45-46, It would have been obvious to one skilled in the art at the time of the invention to employ an amine reducing agent with a camphorquinone initiator. The reason is that Rheinberger et al teach that the  $\alpha$ -diketones, such as camphorquinone, are preferably used with an amine reducing agent. One skilled in the art at the time of the invention

would have been motivated by a reasonable expectation of curing the composition although possibly producing a smear layer as taught by Jochum et al.

With respect to claim 47, It would have been obvious to one skilled in the art at the time of the invention to substitute or include 2,2-dimethoxy-2-phenylacetophenone for or with an acylphosphine oxide initiator in the compositions disclosed by Jochum et al. The reason is that each of Jochum et al and Rheinberger et al teach polymerization of thiol-ene compositions and initiators therefor. Jochum et al teach that acylphosphine oxides and camphorquinone are suitable initiators for thiol-enes, while Rheinberger et al teach that 2,2-dimethoxy phenylacetophenone is also a suitable initiator for thiol-ene compositions. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of would have been motivated by a reasonable expectation that the thiol-ene compositions taught by Jochum et al would be effectively cured using 2,2-dimethoxy phenylacetophenone as initiator.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Susan W. Berman/ whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SB  
10/25/2009

/Susan W Berman/  
Primary Examiner  
Art Unit 1796